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CLINICAL STUDY

Impact of classic massage on blood pressure in patients with clinically diagnosed hypertension

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Abstract

OBJECTIVE: To assess the impact of classic massage on the changes in the values of blood pressure in women with previously diagnosed hypertension.

METHODS: The study involved a group of ten women aged 60-68, who had previously been diagnosed with hypertension. Ten sessions of classic massage of the lower limbs were performed on the subjects. The massage sessions were conducted every day over ten consecutive days. Throughout the treatment, the subjects' blood pressure was measured using a manometer with a stethoscope TRO - CARDIO KIT 2 MONO. Their blood pressure was taken 1 min before the massage, as well as 1 min and 5 min after each session. The study took place between March and June 2013 in Szpital Specjalistyczny im. Jędrzeja Śniadeckiego (Jędrzej Śniadecki Specialist Hospital) in Nowy Sącz, at the Department of Internal Diseases.

RESULTS: For ten consecutive days, the blood pressure values in the examined women were decreasing, with the exception of the diastolic blood pressure measured 5 min after the massage.

CONCLUSION: The drops in blood pressure by several percent, noted in the majority of the female subjects over the time of the study. Classic massage might provide a safe supportive measure in pharmacologic treatment of hypertension.

Key words: Massage; Blood pressure; Hypertension

INTRODUCTION

Recent years have seen an increase in interest in massage. This has clearly had to do with the current tendency to use methods of alternative rather than conventional medicine. Massage, undoubtedly, brings lots of health benefits, and moreover, it relaxes the body.[1]

Heart conditions are, in the present world, the main cause of death and physical handicap. One of the main causes of coronary diseases, cardiac infarction, stroke, nephropathy, and coronary atheromatosis is hypertension, which along with diabetes is the most common disease of our times. The illness often starts in people at their physical and professional peak. With its progress, it often leads to serious complications, which are often life threatening.[2,3]

The definition of hypertension is rather difficult and has to be conventional. Hypertension occurs when during several measurements performed while the person is resting, the blood pressure exceeds the threshold defined as the norm. Taking into account the great changes in blood pressure, before a patient is diagnosed as having a high blood pressure, raised values of their blood pressure must be confirmed during measurements taken repeatedly for several weeks.[4,5]

The condition does not get recognised in almost half of the people suffering from hypertension. What is more, only up to several percent of all cases are treated

successfully. The research is continuous in order to find out more about the pathogenic mechanisms of the condition, as well as to improve the diagnostic methods and its treatment.[6,7]

Having researched the specialist journals, the Author has found just a few articles related to the assessment of the impact of classic massage and other methods of alternative medicine on changes in blood pressure in patients with hypertension.[8-12] Therefore, every new report from that field can extend our knowledge of how to control blood pressure safely and efficiently.

The aim of this study was to assess the impact of classic massage on blood pressure in women with hypertension, aged 60-68. The following questions were raised in the study: How does a series of lower limb classic massage sessions influence the values of blood pressure as measured in the examined women for ten consecutive days? Can classic massage be safely performed in hypertensive persons?

MATERIALS AND METHODS

The study was conducted in a group of 10 women aged 60-68, suffering from hypertension. Such a selection of subjects was intentional. The studied women had a mean age of (63 ± 3) years, body height (167 ± 4) cm, and body weight (70 ± 14) kg. The study took several months, from March till June 2013, and it was conducted in Jedrzej Śniadecki Specialist Hospital in Nowy Sącz (Poland), at the Department of Internal Diseases. All the subjects confirmed a generally low physical activity lifestyle prior to the study. Each woman was taking the medication prescribed by her doctor.

In total, ten lower limbs massage sessions were performed on each patient, one session per day, between the hours of 10.00-12.00, over ten consecutive days. Each session took 20 min (10 min for each limb). The massage of the lower limbs was conducted using the methods recommended by Magiera,[13] along with the Author's own modification (with the exclusion of the pummelling technique). The following techniques were used in sequence: stroking (10% of the total time of the massage session; 5% at the beginning of the session and the other 5% at the end), rubbing (30% of the total time of the massage session), kneading (40%), vibration (10%) and skin rolling (10%). Blood pressure was taken 1 min before each massage session, as well as 1 min and 5 min afterwards. Blood pressure measurements were taken with a manometer with a stethoscope TRO-CARDIO KIT 2 MONO, article number 61022, series: 21 / 707 - 01, Atest-CE0032, REE NO; 61022, LOT 21 / 707-01, 2005-07 in the range of measurements 0-300 mm Hg.

A brief chat with each subject on how they were feeling after the course of massage followed the study. The research was conducted with the permission of the hospital management. The examinations were non-invasive, anonymous, and did not exceed the basic diagnostic standards applied in the case of hypertensive patients. All the female subjects were diagnosed with stable essential hypertension rated as first and second degree according to the classification adopted by Polskie Towarzystwo Nadciśnienia Tętniczego (PTNT; Polish Hypertension Society) in 2003, following the guidelines of the European Society of Hypertension (ESH) and European Society of Cardiology (ESC) which were published in the same year.[14] The examined women had been suffering from hypertension for at least twenty years and had never been given classic massage.

Women who suffered from resistant and secondary hypertension were excluded from the study. The same applied to the women who could not undergo massage due to their health issues. The female subjects were treated with Angiotensin Converting Enzyme Inhibitors (ACEI). An Informed Consent Form was signed by the participants prior to the first massage session. The decisive criterion for participation in the experiment was the decision of the ward head of the hospital department which treated the women.

Statistical methods

The most basic statistical description of the studied variables was then drawn.[15] The following were calculated: mean, standard deviation, median, minimum and maximum. The distribution of each variable was then confirmed with the normal distribution. In order to do so, the Shapiro-Wilk normality test was applied. $P > 0.05$ was the level that a distribution was consistent with the normal distribution.

Where there was normal distribution of both variables in a pair, the *t*-Student test for dependent samples was applied. However, for cases with no normal distribution (for at least one of the two variables in a pair), the non-parametric Wilcoxon test was used. The significant level was $P \leq 0.05$.

RESULTS

The results of the study have been presented in the tables and graphs below.

The mean parameters of systolic blood pressure measured before and after a course of lower limbs massage were close to the top norm value (140 mm Hg), whereas the mean values of diastolic blood pressure noted in all the measurements taken were lower than the norm - they varied between 64, 80-74 mm Hg. The highest value of systolic blood pressure noted down was 160 mm Hg, and of diastolic blood pressure - 90 mm Hg (Table 1).

Table 2 shows the results of the Shapiro-Wilk test. There was no normal distribution for systolic blood pressure measured 1 min before the tenth massage session and 5 min after it. Therefore, in these two cases the Wilcoxon test was applied.

In the pair of variables of systolic blood pressure taken 1 min before the 1st massage session and 1 min before the 10th massage session there is a statistically significant difference. The results in the 10th measurement are significantly lower than in the 1st measurement (comparison of the medians) (Table 3).

There were no significant differences between the mean values in 10th and 1st measurements in three pairs. The only difference which was close to being statistically significant (P = 0.0569) was the difference between the mean values of systolic blood pressure taken 1 min before the 1st and 1 min before the 10th massage session (Table 4).

Figures 1-3 show the mean values of systolic and diastolic blood pressure taken in the course of 10 consecutive days of the experiment. Most of the graphs clearly show a constant fall in the value of the parameters taken during the tests.

Table 5 shows percentage differences between 1st and 10th measurements of systolic and diastolic blood pressure 1 min before, 1 min after, and 5 min after the massage. The most noticeable drop was in the measure-

Table 1 Mean and standard deviation of studied variables in female subjects

Variable	*n*	Mean	Standard deviation
Systolic-I-1 min before	10	144.00	7.38
Systolic-X-1 min before	10	134.20	5.03
Diastolic-I-1 min before	10	74.00	11.74
Diastolic-X-1min before	10	66.50	10.01
Systolic-I-1 min after	10	141.50	10.29
Systolic-X-1min after	10	135.70	4.14
Diastolic-I-1 min after	10	66.30	10.91
Diastolic-X-1 min after	10	64.80	10.97
Systolic-I-5 min after	10	137.40	12.10
Systolic-X-5 min after	10	134.00	4.59
Diastolic-I-5 min after	10	64.80	13.51
Diastolic-X-5 min after	10	66.50	10.01

Table 2 Results of Shapiro-Wilk Normality Test of distribution of the studied variables

Variable	*n*	*W* value	*P* value
Systolic-I-1 min before	10	0.8485	0.0557
Systolic-X-1 min before	10	0.6841	0.0006[a]
Diastolic-I-1 min before	10	0.8729	0.1080
Diastolic-X-1 min before	10	0.9195	0.3528
Systolic-I-1 min after	10	0.9140	0.3098
Systolic-X-1min after	10	0.8814	0.1355
Diastolic-I-1 min after	10	0.8856	0.1513
Diastolic-X-1 min after	10	0.9241	0.3923
Systolic-I-5 min after	10	0.8764	0.1187
Systolic-X-5 min after	10	0.7560	0.0042[a]
Diastolic-I-5 min after	10	0.8875	0.1591
Diastolic-X-5 min after	10	0.9195	0.3528

Note: [a]$P \leq 0.05$.

Table 3 Non parametric Wilcoxon test

Pair of variables	*n*	*t* value	*P* value
Systolic-I-1 min before & Systolic-X-1 min before	10	0.00	0.0117[a]
Systolic-I-5 min after & Systolic-X-5 min after	10	17.50	0.3081

Note: [a]$P \leq 0.05$.

Table 4 Student *t*-test for dependent samples

Variable	*n*	Mean	Standard deviation	*t* value	*P* value
Diastolic-I-1 min before	10	74.00	11.74	2.18	0.0569
Diastolic-X-1 min before	10	66.50	10.01		
Systolic-I-1 min after	10	141.50	10.29	0.65	0.1327
Systolic-X-1 min after	10	135.70	4.14		
Diastolic-I-1 min after	10	66.30	10.91	0.50	0.6275
Diastolic-X-1 min after	10	64.80	10.97		
Diastolic-I-5 min after	10	64.80	13.51	− 0.61	0.5600
Diastolic-X-5 min after	10	66.50	10.01		

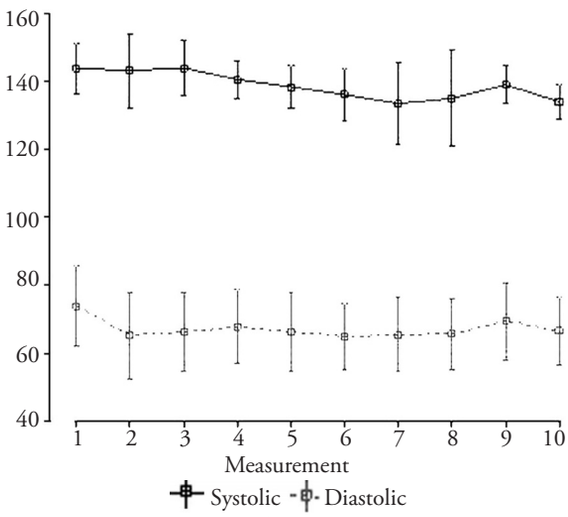

Figure 1 Mean values of systolic blood pressure (upper graph) and diastolic blood pressure (lower graph), in mm Hg, measured 1 min before the massage of the lower limbs over the period of 10 consecutive days

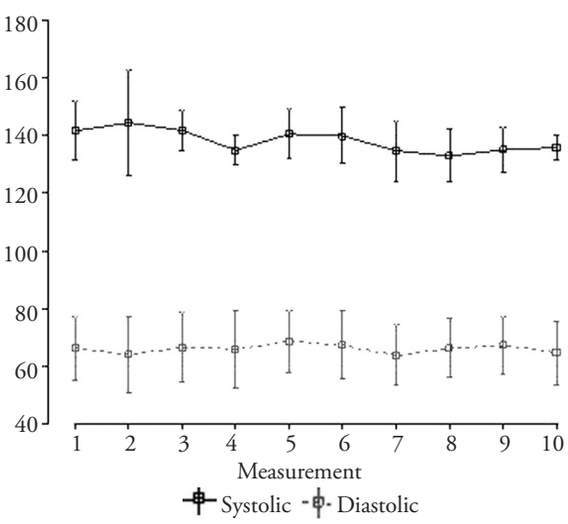

Figure 2 Mean values of systolic blood pressure (upper graph) and diastolic blood pressure (lower graph), in mm Hg, measured 1 min after the massage of the lower limbs over the period of 10 consecutive days

ment of systolic and diastolic blood pressure taken 1 min before the massage (6.81% and 10.14% respectively). In six pairs of measurement, it was only one variable (nr 6) which showed a 2.62% increase in diastolic blood pressure.

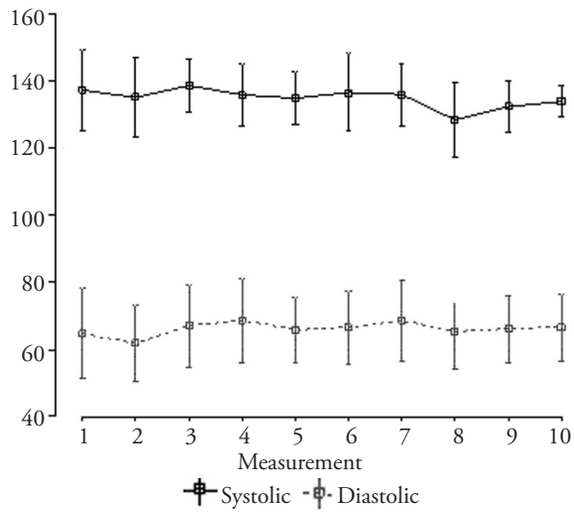

Figure 3 Mean values of systolic blood pressure (upper graph) and diastolic blood pressure (lower graph), in mm Hg, measured 5 min after the massage of the lower limbs over the period of 10 consecutive days

DISCUSSION

The study has shown that classic massage of the lower limbs caused, in a various way, changes in the subjects' systolic and diastolic blood pressure. Having analysed the changes over the days of the study, it could be noted that the parameters kept changing after each subsequent massage session. Generally speaking, the mean values of systolic and diastolic blood pressure kept decreasing. Therefore, the few percent drops in blood pressure in most cases should be noted here.

The most beneficial changes in blood pressure dropping ($P \leq 0.05$) occurred when systolic blood pressure was measured 1 min before the massage started. The mean value of systolic blood pressure taken 1 min before the first massage session was (144 ± 7) mm Hg. However, just before the last massage session, this value was only (134 ± 5) mm Hg, which indicates a drop of 6.81%.

Also, a drop of more than 10% in diastolic blood pressure was noted during the measurement taken 1 min before a massage session was due to start. Before the very first massage session, the mean value of diastolic blood pressure was (74 ± 12) mm Hg, whereas before the 10th session, this value was only (66 ± 10) mm Hg.

Table 5 Percentage differences between 1st and last measurement

No.	Variable	Mean	Difference (%)
1	Systolic I-1min. before	144.0	6.81
	Systolic X-1 min. before	134.2	
2	Diastolic I-1 min. before	74.0	10.14
	Diastolic-X-1 min.before	66.5	
3	Systolic-I-1 min. after	141.5	4.10
	Systolic-X- 1 min. after	135.7	
4	Diastolic-I-1 min. after	66.3	2.27
	Diastolic-X-1 min. after	64.8	
5	Systolic-I-5 min. after	137.4	2.48
	Systolic-X-5 min. after	134.0	
6	Diastolic-I-5 min. after	64.8	-2.62
	Diastolic-X-5 min. after	66.5	

The noted difference was close to the statistically significant one (the calculated *P* was 0.0569).

It was women D and J who drew particular attention of the Author of this study. The value of systolic blood pressure of woman D before the first massage session was 160 mm Hg, whereas before the second session it was only 120 mm Hg. The drop was therefore of 25%. During the subsequent measurements the value of systolic blood pressure was around 140 mm Hg. The next significant drop was noted on day 8 when the value was 125 mm Hg. In comparison with the first measurement, it was a drop of 22%. After the whole course of massage, woman D had her systolic blood pressure dropped by 19%.

Before the first session, woman J's systolic blood pressure was 140 mm Hg. However, on day 7, before the massage session, the value was 115 mm Hg (drop of 18%). Having compared the values of systolic blood pressure before the first and last day of massage session in this person, a drop of 8% was noted.

The changes of parameters of systolic and diastolic blood pressure occurring after classic massage session can be explained by the reflex theory, which refers to the impact of massage on the circulatory system. Massage causes blood vessels and lymphatic vessels to expand, which accelerates the blood and lymph flow. Massage increases the flow of venous blood and decreases the resistance of blood in arteries, which makes the heart pumping action easier, and this increases the minute heart volume.[9]

Only a few studies have been so far conducted confirming a positive influence of classic massage on lowering blood pressure. Olney[16] did an experiment on a group of eight people. He performed courses of ten back massage sessions lasting 10 min each, three times a week, in patients with clinically diagnosed high blood pressure. The analysis of the results led him to a conclusion that regularly performed back massage had lowered the patients' systolic and diastolic blood pressure. Cady *et al* [17] did a similar study. They assessed the impact of a 15-minute back massage session performed in subjects' place of work on reduction of their level of stress, which was evaluated based on the changes of the subjects' blood pressure. Their blood pressure was taken before and after a massage session. The analysis of the results showed a significant drop in both systolic and diastolic blood pressure. Supa'at *et al* [9] also confirmed positive impact of classic massage on the reduction of systolic and diastolic blood pressure after a four weeks' massage course. Holland *et al* [18] conducted a study during which they performed calm and smooth back massage for three consecutive days on patients aged 52-88. Following the study, a drop of systolic and diastolic blood pressure was noted in all the subjects. Most of them confirmed that the massage made them feel better and more relaxed. The same was stated by the women who took part in this study.

The same opinion was shared by Aourella *et al*.[19] They provided treatment in the form of a 12-week massage course divided into 4-week sessions. During the first and third session they performed massage on the back, neck and chest or the lower limb, the upper limb and face. The second session provided a break. During the first session systolic blood pressure dropped immediately after the massage. However, no significant changes in diastolic pressure were noted. During the second session massage of the back, neck and chest made systolic and diastolic blood pressure drop, whereas massage of the lower limb, the upper limb and face raised systolic blood pressure. The authors of the study came to a conclusion that massage could be used as a supplementary technique in treatment of patients with hypertension caused by chronic stress.

Walaszek *et al* [20] however, are of a different opinion. They assessed the impact of ten classic back massage sessions on changes in blood pressure, in eleven men

aged 50-67, with high blood pressure. The subjects' blood pressure was taken in a similar way to the way it was done in this study (1 min before the massage, as well as 1 min after it). The authors came to a conclusion that classic back massage makes no significant difference to blood pressure of the male subjects. However, the noted few percent drops of blood pressure made the patients feel more relaxed. Similar changes were reported in female subjects analysed in the present study.

Based on the study and the subject literature, one can conclude that classic massage has a positive influence on the level of blood pressure. It should be noted here, however, that both this study and some others were based on a small group of patients due to the time-consuming nature of the study. In order to draw more credible conclusions, a study of this nature should be based on a larger group.

In conclusion, the classic massage could be a safe supportive measure in pharmacologic treatment of hypertension, since no deterioration of health was observed in all of the examined women.

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